

PRELIMINARY STUDY OF BIR N'HAS BASE METAL VEIN, CENTRAL JEBILET, MOROCCO: MINERALOGY AND FLUID INCLUSION CHARACTERIZATION

Nshimiyimana Félix, Essarraj Samira, Hibti Mohamed

Laboratoire Géoressources, Urac 42, Faculté des Sciences et Techniques Marrakech,
Université Cadi Ayyad,
BP 549, Marrakech, Maroc.

Correspondence: nfelix2020@yahoo.com; essarraj.samira@yahoo.fr

BirN'Has base metal veins are located approximately at 30 km to the North of Marrakesh city-Morocco, in the central part of the Jebilet Paleozoic massif (Huvelin, 1977). The host rocks correspond to the Sarhlef schist, metamorphosed and deformed in the Upper Visean-Namurian (Huvelin, 1977). The main vein of Bir N'Has oriented E-W is vertical, 1.5 to 2 meters thick and crosscuts schist and micaschist (frequently containing cordierite and andalusite) showing a schistosity S1 oriented N20°E and dipping 85° to the NW in the vein area. The vein infillings correspond to zoned prismatic and geodic quartz and carbonates (ankerite),

This preliminary study has been carried out in order to characterize the mineralogy of BirN'Has vein in relation with fluid circulation that may have deposited base metals. The mineralogical study has shown the presence of sphalerite, galena, chalcopyrite and gray copper. The gangue mineral is mainly quartz subdivided into two types: geodic/feathery quartz (Q1) and mosaic quartz (Q2). Thus, the paragenetic sequence can be subdivided into two stages of deposition:

***Stage 1:** corresponding to the deposition of the geodic quartz (Q1) showing microscopic feathery texture and associated to dark-brown sphalerite.

***Stage 2:** corresponding to the deposition of galena, chalcopyrite associated with quartz as rounded crystals showing mosaic texture (Q2) and likely with some crystals of ankerite observed close to galena. Small amount of gray copper deposited later than chalcopyrite and galena and is mostly altered to covellite in our samples.

Microthermometric study of fluid inclusions (FI) in quartz vein of BirN'Has has been done only in the quartz Q2 because those in feathery quartz Q1 are all decrepitated or necked down. FI in Q2 are mainly decrepitated (natural decrepitation) and those able to microthermometric study are relatively rare. Two FI types have been distinguished: scattered FI and fluid inclusion planes (FIP, secondary).

***Scattered FI:** they are more abundant than secondary FI and they present different shapes, oval, spherical. All of them are aqueous two-phase FI at room temperature (liquid and vapor). Melting temperature of ice (T_m ice) ranges between -22.8 and -15.7 °C with the mode at -17.7 °C. Corresponding salinity ranges from 19.2 to 23.1 wt % eq. NaCl with the mode at 20.8 wt% eq. NaCl. Homogenization temperatures (T_h) range between 92 and 200 °C with a mode at 115 °C to the liquid phase.

***Fluid inclusions in planes (secondary):** they are rare in the studied samples and are all two-phase FI (liquid and vapor) at room temperature. The T_m ice range from -18.9 to -17.2 °C with a mode at -17.4 °C. Corresponding salinity ranges between 20.4 and 21.6 wt% eq. NaCl with the mode at 20.6 wt% eq. NaCl. T_h range between 96 and 120 °C to the liquid.

Thus all secondary fluid inclusions show relatively lower homogenization temperature than most of primary FI which display higher salinity for numerous FI.

Some primary two-phase FI, more likely aqueous have been observed in sphalerite, but the dark aspect of the Bir N'has sphalerite and the small size of those FI did not allow us to carry out microthermometric measurement on those FI.

Preliminary conclusions of this study suggest that primary FI in Q2 correspond to the brine which has deposited galena and chalcopyrite, while the secondary FI correspond to brine which have deposited the gray copper because both FIP and grey copper crosscut Q2 associated to galena and chalcopyrite. However, galena-chalcopyrite and grey copper could be considered globally as resulting from the circulation of a unique brine which cooled from the galena-chalcopyrite sub-stage to grey copper sub-stage. These mineralogical and fluid inclusion results are planned to be completed later in the light of a future more detailed study envisaged in order to characterize fluid circulations and associated base metals and precious metals in the Central Jebilet.

References:

HUVELIN P. (1977) Notes Mém. Serv. Géol. Maroc, No 232 bis.